

CONCENTRATIONS p. 126 #1-3

$$\begin{aligned}\#1 \quad \% \text{ CONC. (v/v)} &= \frac{\text{VOLUME OF SOLUTE}}{\text{VOLUME OF SOLUTION}} \times 100\% \\ &= \frac{4.1\text{L}}{55\text{L}} \times 100\% \\ &\quad \swarrow \text{same units } \checkmark \\ &= 7.45\%\end{aligned}$$

$$\begin{aligned}\#2 \quad \% \text{ CONC (m/v)} &= \frac{\text{MASS OF SOLUTE}}{\text{VOLUME OF SOLUTION}} \times 100\% \\ &= \frac{16\text{g}}{500\text{mL}} \times 100\% \\ &= \frac{16\text{g}}{500\text{g}} \times 100\% \\ &= 3.2\%\end{aligned}$$

$$\begin{aligned}\#3 \quad \% \text{ CONC (m/v)} &= \frac{\text{MASS OF SOLUTE}}{\text{VOLUME OF SOLUTION}} \times 100\% \\ &= \frac{27.5\text{g}}{550\text{mL}} \times 100\% \\ &= 5\%\end{aligned}$$

MOLAR CONCENTRATIONS p. 128 #4-7

p. 128 #4/ $M_{NaOCl} = 5.25g$

$$V = 100 mL = 0.1 L$$

$$C = ?$$

$$C = \frac{m}{V}$$

$$= \frac{5.25}{0.1}$$

$$= 52.5$$

$$= 0.705 \text{ mol/L}$$

$$\eta = m/mm$$

$$= 5.25/74.5$$

$$= 7.05 \times 10^{-2}$$

#5 $M_{NaCl} = 235g$

$$V = 3.0 L$$

$$C = ?$$

$$C = \frac{m}{V}$$

$$= 4.02/3$$

$$= 1.34 \text{ mol/L}$$

$$\eta = m/mm$$

$$= 235/58.5$$

$$=$$

#6 $M_{HCl} = 7.66g$

$$V = 1.50 L$$

$$C = ?$$

$$C = \frac{m}{V}$$

$$= \frac{0.210}{1.5}$$

$$= 0.140 \text{ mol/L}$$

$$\eta = m/mm$$

$$= 7.66/36.5$$

$$= 0.210$$

#7 $M_{K_2Cr_2O_7} = 102.9g$

$$V = 1.75 L$$

$$C = ?$$

$$C = \frac{m}{V}$$

$$= 0.350/1.75$$

$$= 0.200 \text{ mol/L}$$

$$\eta = m/mm$$

$$= 102.9/294.2$$

$$= 0.350$$

MOLAR CONCENTRATIONS p.129 #8-11

p.129 #8 $\eta = ?$

$$V = 50.0 \text{ mL} = 0.05 \text{ L}$$

$$C = 0.570 \text{ mol/L}$$

$$C = \eta/V$$

$$\eta = CV$$

$$= (0.570)(0.05)$$

$$= 0.0285 \text{ mol/L}$$

————— u ————— u —————

#9 $C = 12.4 \text{ mol/L}$

$$\eta = ?$$

$$V = 1.50 \text{ L}$$

$$C = \eta/V$$

$$\eta = CV$$

$$= 12.4 \times 1.50$$

$$= 18.6 \text{ mol/L}$$

————— u ————— u —————

#10 $\eta = ?$

$$V = 25 \text{ mL} = 0.025 \text{ L}$$

$$C = 1.9 \times 10^{-3} \text{ mol/L}$$

$$C = \eta/V$$

$$\eta = CV$$

$$= (1.9 \times 10^{-3})(0.025)$$

$$= 4.75 \times 10^{-5} \text{ mol/L}$$

————— u ————— u —————

#11 $V = 35.8 \text{ mL} = 0.0358 \text{ L}$

$$C = 0.0176 \text{ mol/L}$$

$$\eta = ?$$

$$C = \eta/V$$

$$\eta = CV$$

$$= (0.0176)(0.0358)$$

$$= 6.3 \times 10^{-4} \text{ mol/L}$$

MOLAR CONCENTRATIONS p.131 #12-15

p.131 #12 $C = 0.055 \text{ mol/L}$

$V = ?$

$n = 4.1 \text{ mol}$

$C = \frac{n}{V}$

$V = \frac{n}{C}$

$= \frac{4.1}{0.055}$

$= 74.5 \text{ L}$

———— " ———— " ————

#13 $V = ?$

$C = 7.6 \text{ mol/L}$

$n = 0.050$

$C = \frac{n}{V}$

$V = \frac{n}{C}$

$= \frac{0.050}{7.6}$

$= 0.0066 \text{ L} = 6.6 \text{ mL}$

———— " ———— " ————

#14 $n = 1.25$

$C = 6.0 \text{ mol/L}$

$V = ?$

$C = \frac{n}{V}$

$V = \frac{n}{C}$

$= \frac{1.25}{6.0}$

$= 0.208 \text{ L} = 208 \text{ mL}$

———— " ———— " ————

#15 $V = ?$

$C = 0.0020 \text{ mol/L}$

$n = 5.0 \text{ mol}$

$C = \frac{n}{V}$

$V = \frac{n}{C}$

$= \frac{5.0}{0.002}$

$= 2500 \text{ L}$

CONCENTRATIONS - ppm + ppb

p. 133 #16 $m = 3.2 \text{ mg} = 0.0032 \text{ g}$
 $V = 500 \text{ L} = 500,000 \text{ mL}$

$$\text{Conc. (ppm)} = \frac{m}{V} \times 10^6$$

$$= \frac{0.0032}{500,000} \times 10^6$$

$$= 6.4 \times 10^{-3} \text{ ppm}$$

SUCH A # WOULD BE
COMMUNICATED AS 6.4 ppb

#17 $m = 3 \times 10^{-5} \text{ g}$
 $V = 1 \text{ L} = 1000 \text{ mL}$

$$\text{Conc (ppm)} = \frac{m}{V} \times 10^6$$

$$= \frac{3 \times 10^{-5}}{1000} \times 10^6$$

$$= 0.030 \text{ ppm OR } 30 \text{ ppb}$$

#18 $m = 1.8 \text{ mg} = 0.0018 \text{ g}$
 $V = 350 \text{ mL}$

$$\text{Conc (ppm)} = \frac{m}{V} \times 10^6$$

$$= \frac{0.0018}{350} \times 10^6$$

$$= 5.14 \text{ ppm}$$